Young children contrast their behavior to that of out-group members

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Acknowledgements

We thank Steven Tipper and the Minerva Research Group on Cultural Cognition for advice, Saana Korki for data collection, Charlotte Murphy, Christopher Pease and Emma Holmes for stimuli creation and Matthew Leonard for coding. This work was supported by the Economic and Social Research Council (grant number ES/K006702/1).

Abstract

The tendency for children to overimitate and conform to unanimous majorities is pervasive. Here we tested whether social factors are powerful enough to lead children to overcome this tendency and contrast their behavior to that of others. In one condition, children were shown a video of three out-group members performing the same action on a novel toy. Five-year-old children, but not four-year-old children, in this condition were significantly more likely to produce the contrasting action than the action demonstrated by the group. On the other hand, children who saw the same actions performed by neutral individuals typically matched their actions to those of the group regardless of their age. By demonstrating that five-year-old children actively contrast their behavior to that of out-group members, these results provide an important comparison to previous research on imitation and conformity and demonstrate the profound influence that social motivations exert over children's copying behavior.

Key words:

social cognitive development; social learning; contrast effects; overimitation; conformity; group membership

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Children are prolific imitators. Their inclination to imitate is so powerful that they faithfully reproduce the actions of a demonstrator even when those actions have no apparent purpose or causal function. This phenomenon is known as 'overimitation' (Lyons, Young & Keil, 2007). The tendency to overimitate is so strong that three- to five-year-old children copy the actions of a demonstrator even when they have been directly instructed not to, when they have been trained to identify irrelevant actions, and when doing so means they risk losing a competition (Lyons, Damrosch, Lin, Macris & Keil, 2011; Lyons et al., 2007). Perhaps just as powerful is the tendency to conform to unanimous majorities. Haun and Tomasello (2011) demonstrated that children sometimes conform to the opinions of a majority, even when those opinions are clearly false.

However, children do not always copy so faithfully (Flynn & Whiten, 2008). The social environment is one important factor in modulating the actions children reproduce (Nielsen, 2009; Over & Carpenter, 2013). For example, four- and five-year-olds imitate more faithfully when they have a goal to affiliate (Over & Carpenter, 2009) and when the model is watching their actions (Nielsen & Blank, 2011). Social factors have also been shown to influence how likely children are to copy certain models. For example, young children are more likely to reproduce the actions of in-group than out-group members (Howard, Henderson, Carrazza & Woodward, 2014). This has been interpreted as evidence that children ignore behavior modeled by out-group members because it is less relevant to them (Howard et al., 2014).

Here, we investigate whether there are times at which children do not ignore, but actively contrast, their behavior to that of out-group members.

Previous research has demonstrated that adults sometimes seek to distance their behavior from that of the out-group (Ruys, Spears, Gordijn & De Vries, 2007). For example, adults react faster in a lexical decision task when primed with an elderly out-group (Schubert & Hafner, 2003) and alter their preferences towards an object to make them dissimilar to those of an out-group (Izuma & Adolphs, 2013).

We know from previous research that group membership exerts a powerful influence over young children's behavior and cognition. For example, five-year-olds prefer members of their own group to members of another group, even when these groups are minimal (Dunham, Baron & Carey, 2011). These preferences influence children's resource distribution such that children are more generous to in-group members (Buttelmann & Bohm, 2014). Further research has demonstrated that, in addition to preferring in-group to out-group members, children show signs that they negatively evaluate out-group members. For example, five-year-olds are more likely to attribute negative traits to the out-group compared to the in-group (Aboud, 2003). Moreover, after their sixth birthday, children give negative resources to out-group members rather than giving them to no-one (Buttelmann & Bohm, 2014).

We were interested in whether children actively contrast their behavior to that of out-group members. We showed children two possible ways to operate a novel light-box. We then presented children with a video in which three individuals demonstrated one of the ways to operate the light-box. In the Out-group condition, the three individuals on the video had been allocated to a different group from the child. We compared children's performance in this condition to a Neutral condition in which neither the child nor the three

individuals on the video had been allocated to a group. We chose a Neutral condition rather than an in-group comparison condition as we wanted to ensure that any differences between the conditions were driven by children's responses to the out-group rather than by their preference for their own group. We predicted that children would imitate the actions of the three individuals on the video more often in the Neutral condition than in the Out-group condition.

Demonstrating that children distinguish between out-group members and neutral individuals is a first step towards showing contrast effects. However, assuming we found this pattern of results, it would be compatible with two different explanations. First, that children ignore members of their out-group and second that they actively contrast their behavior to that of out-groups. We thus had a further prediction about performance within the Out-group condition. We reasoned that if children *ignore* the behavior of the out-group, then they should produce the two possible actions equally often in this condition. If children *contrast* their behavior to that of the out-group, then they should reproduce the action demonstrated by the out-group significantly less often than the alternative action.

Our main interest was in whether five-year-olds would show these effects. Previous research has shown that children at this age overimitate (Horner & Whiten, 2005; Lyons et al., 2007) and that they do so more than younger children (McGuigan, Whiten, Flynn & Horner, 2007). Moreover, their imitation is influenced by social factors (Over & Carpenter, 2009). This age is also important in the development of group membership. Not only are five-year-olds relatively more positive towards in-group members (Dunham et al., 2011; Kinzler, Dupoux,

& Spelke, 2007), they also show signs of negatively evaluating out-group members (Aboud, 2003).

We also wanted to explore whether younger children would show these effects. Thus, we later tested a sample of four-year-olds. Four-year-olds also imitate faithfully (Lyons et al., 2007) and sometimes conform to unanimous majorities (Haun & Tomasello, 2011) and their imitation too is influenced by social factors. However, previous research has suggested that whereas five-year-olds show signs of out-group negativity, four-year-olds do not (Aboud, 2003). It is thus possible that these younger children will not show as strong evidence of contrast effects.

Method

Participants

Forty-eight five-year-olds (*mean* 5;6; *range* 5;0 – 5;11; 24 girls) and 48 four-year-olds (*mean* 4;7; *range* 4;0 - 4;11; 23 girls) participated. Three further children were excluded: two five-year-olds (one due to parental interference and the other due to experimenter error), and one four-year-old (for failing to complete the experiment).

Materials

The novel light-box was made up of a blue touch lamp mounted on a wooden block that was approximately 25cm x 25cm x 3cm in size. The lamp could be turned on or off by pressing the top. The edges of the wooden block were covered in blue contact paper (see Figure 1).

The actors in the videos were two females and a male. The actor on the left demonstrated the relevant action first. After she completed the action, the actor beside her moved the light-box in front of himself and repeated the same action. The third actor then did the same, such that the participant viewed the three models demonstrating the same action consecutively. In the Out-group condition, the actors wore colored scarves and wristbands to signify they were in either the Yellow or Green group. In the Neutral condition the actors were not wearing any scarves or wristbands. Each video lasted about 35 seconds.

One of the actions demonstrated by the group was 'prayer' (see Figure 1a and c). For this action, the actor first pressed the palms of both hands together (as though in a prayer position) and pushed down on the lamp using the side of her hands to turn it on. She then moved her hands away from the light-box and out to her sides before repeating the action to turn the lamp off. The second novel action was 'elbow' (see Figure 1b and d). For this action, the actor lifted her right hand to her right shoulder, turned the lamp on with her elbow, took her elbow off the lamp and out to the side of the light-box, before repeating the action to turn the lamp off.

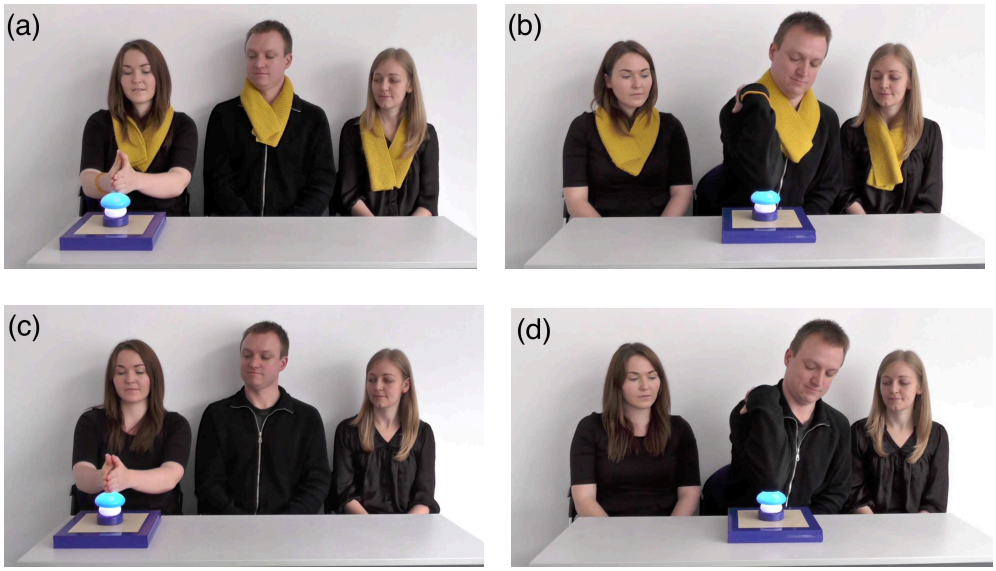

Figure 1. The models demonstrating the target actions on the novel light-box in the Out-group and Neutral conditions. Panel (a) shows the first actor in the Out-group condition demonstrating the prayer action. Panel (b) shows the second actor in the Out-group condition demonstrating the elbow action. Panel (c) shows the first actor in the Neutral condition demonstrating the prayer action and panel (d) shows the second actor in the Neutral condition demonstrating the elbow action.

Design

Children participated in one of two conditions in a between-subjects design: Out-group or Neutral. The dependent variable was the first action participants performed after being given the light-box.

Procedure

Participants in the Out-group condition were allocated to one of two novel groups. To do this, children were asked to draw a token (either yellow or green) from a bag. Depending on the color of the token drawn, the experimenter told

the child that he or she was assigned to a Yellow or Green group (while this procedure appeared random to the child, it was actually fixed in order to ensure an equal number of children were allocated to each group). Children were asked to wear a scarf and wristband reflecting the color of their group. In addition, E asked children to complete a short categorization task involving moving photographs of in- and out-group members towards and away from them and read them a brief story describing how the Yellow and Green groups compete against each other. This was done to increase the salience of the two groups and their significance for the children.

E then demonstrated the two actions (prayer and elbow) on the light-box. As she demonstrated these actions, she said, *"Look at this! Some people do it like this* (demonstrated the first action)*. But some people don't do it like that, they do it like this* (demonstrated the second action)." Then E positioned a laptop in front of the participant showing three individuals on the screen and said, *"Hmmm. These people are in the Yellow/Green group, a different group from you. Let's see how the people in the Yellow/Green group do it."* The participant then watched a video of three out-group members demonstrating one of the actions. After the video, E said, "*So that's how the people in the Yellow/Green group, the other group from you, do it."* After this, E shuffled some papers for five seconds and then, turning back to the child said, *"Ooh, just straighten up your yellow/green scarf"* before pushing the light-box towards the child, saying, *"Look at this again! How do you want to do it?"* The test phase lasted for 30 seconds or until children made it clear that they were finished.

In the Neutral condition, participants were not assigned to a group but they were told the story in which the Yellow and Green groups compete with

each other (this was to control for the possibility that competition alone leads to contrast effects). As in the Out-group condition, E demonstrated the two actions on the light-box. After this, E again positioned the laptop in front of the child, but in this condition the screen showed the three individuals without their colored scarves and wristbands. E then said, *"Hmmm. Let's see how these people do it".* The participant then watched a video of three individuals demonstrating one of the actions. After the video, E said, "*So that's how those people do it".* As in the Out-group condition, E then shuffled some papers for five seconds before pushing the light-box towards the child, saying, *"Look at this again! How do you want to do it?"* (just as she did in the Out-group condition). The test phase was identical to the Out-group condition[1].

Counterbalancing

The order in which E first showed children the two actions (prayer and elbow) was counterbalanced, as was the action children saw presented on the video. Within the Out-group condition, half of children were assigned to the Yellow group (whereas the individuals on the video were assigned to the Green group) and half of children were assigned to the Green group (whereas the individuals on the video were assigned to the Yellow group).

Coding

The data were coded from video by the first author. Children's responses were initially coded as either 'prayer' or 'elbow'. An action was coded as 'prayer'

[1] In both conditions, we also asked children three follow-up questions after the test phase: *"Do you think there is a right way to do it?", "What do you think is the right way to do it?" and "Why do you think that is the right way to do it?".* However, as the children were so young, they were not typically able to give informative answers to these questions and so we do not consider their responses further.

if the child turned the lamp on with the side of either one or both hands and/or took both hands out to the side of the light-box as modeled in the demonstration. An action was coded as 'elbow' if the child turned the lamp on with their elbow or a part of their arm directly above or below their elbow and/or took their elbow out to the side of the light-box as modeled in the demonstration. 'Prayer' and 'elbow' responses were then coded as either matching or contrasting depending on whether they were the same as or different from the actions the group modeled on the video children saw. If children produced any other action, for example, turning on the light using the palm of their hand, this was coded as 'other'. Children did not have to successfully turn on the light for their responses to be coded into these categories, reproducing the relevant actions on the light-box was sufficient.

An independent observer unaware of the hypotheses of the study coded a randomly selected 25% of the videotaped testing sessions at each age. Agreement between the two raters was perfect, 100%.

Results

Five-year-olds

Preliminary analyses revealed no effect of the counterbalancing variables on performance, so we collapsed across them and do not consider them further. As predicted, a chi-squared test of independence revealed a significant difference between the two conditions, X^2 (1, N = 33) = 13.60, p < .001, φ = .64, suggesting that more children matched the actions of the individuals in the Neutral condition than matched the actions of the individuals in the Out-group condition (see Figure 2a). Within the Out-group condition, an observed vs. expected chi-

squared test revealed that more children contrasted their actions to the group than matched those actions, X^2 (1, N = 18) = 5.56, p = .018 providing evidence that children did not ignore, but rather contrasted their behavior to that of the out-group.

Not surprisingly, more children matched their actions to the individuals in the Neutral condition than produced the contrasting action, X^2 (1, N = 15) = 8.07, p = .005 emphasizing that children's default tendency is to imitate.

Fifteen children did not produce either matching or contrasting responses. Typically, these children turned on the light-box with the palm of their hand (five in the Out-group and six in the Neutral condition) although four children did not perform any action on the light-box (one in the Out-group and three in the Neutral condition). We do not discuss these actions further because we consider them uninformative in relation to our hypotheses: children who took no information at all from the videos would presumably turn on the light-box using the palm of their hand[2]. Following previous research, we assume that children who used the palm of their hand did so because this was the action that was most strongly associated with the goal of turning on the light (Gergely, Bekkering & Kiraly, 2002).

[2] Note, however, that if we re-code these 'other' actions into the 'contrast' category, the difference between conditions and within the Out-group condition remain statistically significant for the five-year-olds. For the four-year-olds, there remains a significant difference between conditions but not within the Out-group condition.

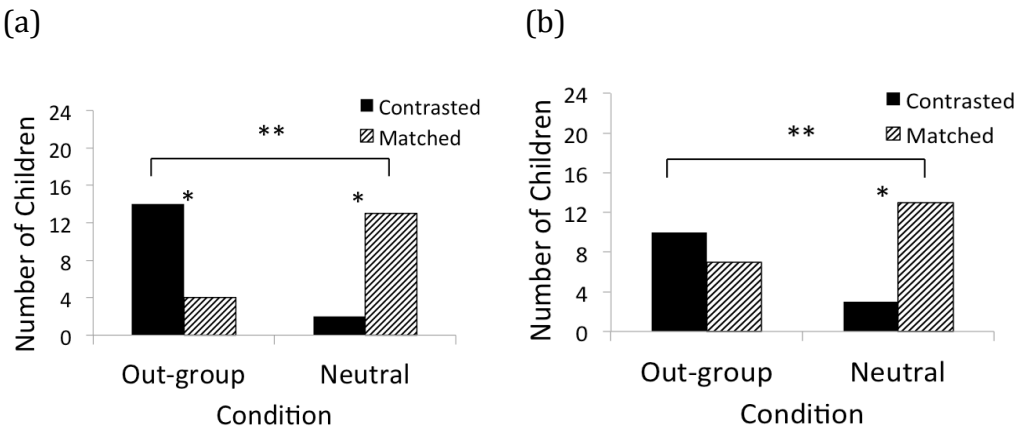

Figure 2. The number of (a) five-year-old children and (b) four-year-old children who contrasted vs. matched their actions to those of the group in the Out-group and Neutral conditions. (Note that data for children who failed to provide a response, or produced 'other' actions, are not plotted).

Four-year-olds

Preliminary analyses of the data revealed no effect of the counterbalancing variables on children's performance, so we collapsed across them and do not consider them further. A chi-squared test of independence revealed a significant difference between the two conditions, X^2 (1, N = 33) = 5.54, p = .019, φ = .41, demonstrating that more children matched the actions of the individuals in the Neutral condition than matched the actions of the individuals in the Out-group condition (see Figure 2b). However, within the Out-group condition, an observed vs. expected chi-squared test revealed that children did not contrast their actions to the group more often than they matched those actions, X^2 (1, N = 17) = .529, p = .467. As a result, we cannot confidently infer that these younger children were contrasting their behavior from the out-group (rather than simply ignoring it).

Like the five-year-olds, more four-year-old children matched their actions to the individuals in the Neutral condition than produced the contrasting action, X^2 (1, N = 16) = 6.25, p = .012. Fifteen four-year-olds did not produce either matching or contrasting responses. Eleven children turned the light-box on with the palm of their hand (six in the Out-group and five in the Neutral condition), and four children did not perform any action on the light-box (one in the Out-group and three in the Neutral condition).

Age Comparison

We compared the data from both ages in a logistic regression. The logistic regression model was statistically significant, X^2 (3) = 21.20, p < .001. The model explained 37% (Nagelkerke R^2) of the variance in children's performance and correctly classified approximately 76% of cases. The only significant predictor in the model was the condition children were assigned to. Children were more likely to contrast their behavior to that of out-group members than to that of neutral individuals. Age was not a significant predictor and there was no significant interaction between age and condition (see Table 1).

Table 1

*Beta Values, Odds Ratios and 95% Confidence Intervals for the Predictor Variables of Condition, Age, Condition*Age Interaction, and the Constant in the Logistic Regression Model*

		95% CI for Odds Ratio		
	B (SE)	Lower	Odds Ratio	Upper
Constant	1.25 (0.57)			
Condition	- 3.13* (0.95)	.01	.04	.28
Age	- 0.90 (0.75)	.09	.41	1.78
Condition*Age	1.30 (1.25)	.32	3.68	42.22

Note: R^2 = .00 (Hosmer & Lemeshow), .28 (Cox & Snell), .37 (Nagelkerke), * p = .001

Discussion

We investigated whether five-year-old children contrast their behavior to that of out-group members. The comparison between the Out-group and Neutral conditions demonstrated that children treat out-group members differently from neutral individuals within a social learning context. Children matched the behavior of the individuals in the Neutral condition more often than they matched the behavior of the individuals in the Out-group condition. The results of the Out-group condition further demonstrated that children of this age do not simply ignore the out-group. Within this condition, children contrasted their behavior to that of the group significantly more often than they matched their behavior to the group.

Our results provide a counterpoint to research on imitation and conformity. Previous research has demonstrated that children overimitate (Horner & Whiten, 2005; Lyons et al., 2007) and conform (Haun & Tomasello, 2011). Here we show that, depending on the social context, children sometimes produce the opposite of the actions they have witnessed from a majority. These results complement previous research demonstrating that social factors influence the extent to which children imitate (Nielsen & Blank, 2011; Over & Carpenter, 2009) and extend them by demonstrating that social factors can lead to contrastive behavior.

These results also contribute to our understanding of group membership. Previous research has demonstrated that children prefer members of their own group to members of other groups (Bigler, Jones, & Lobiner, 1997; Dunham et al., 2011; Kinzler et al., 2007). Additionally, from around the age of five or six children start to treat out-group members negatively compared to neutral individuals (Aboud, 2003; Buttelmann & Bohm, 2014). Our findings extend this, demonstrating that children behaviorally distance themselves from out-group members. This can be taken as further evidence that young children are reacting to the behavior of the out-group and not merely showing in-group preferences.

It is worth noting that we found stronger evidence for contrastive behavior in five-year-olds than four-year-olds. Although children at both ages showed a significant difference between conditions, when we looked at performance within the Out-group condition, only the five-year-olds showed clear evidence of contrasting their behavior to that of out-group members. It is interesting to consider why this might be. Previous research has shown that five-year-olds show signs of out-group negativity but four-year-old children do not

(Aboud, 2003). Further research should investigate the possibility of developmental change in this behavior and measure how it relates to the emergence of out-group negativity.

Our findings raise other important questions for future research. For example, it will be important to investigate the strength of children's motivation to contrast their behavior to that of out-group members and, in particular, whether children will contrast their behavior to that of the out-group even if it makes their actions less efficient. It will also be important to investigate the motivations underlying contrastive behavior and whether contrast effects are driven by a desire to be different from the out-group or the desire to be seen to be different from the out-group.

The tendency for humans to overimitate and conform is extremely powerful. There are good reasons for this; copying others brings many benefits (Chudek & Henrich 2011). However, the tendency to copy can be overcome, and even reversed, by social processes. At least in some situations, children actively contrast their behavior to that of out-group members. This provides a noteworthy comparison to previous research and demonstrates the deeply social nature of the copying process.

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